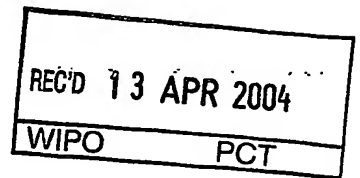




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Toy building block suited screw and tool for screw

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Toy building block, suited screw and tool for screw

The present invention relates to a toy building block according to the preamble of claim 1. It also relates to a
5 screw suited to be used in the toy building block according to the preamble of claim 11 and a screwdriver tool according to claim 14.

Toy building blocks for stacking one on top of the other are
10 generally provided with studs on their top surface and with corresponding recesses on their bottom surfaces. The studs can be pushed into the recesses with more or less force, whereby the engaged force is related to the strength of the thereby established interconnection of two building blocks.
15 After some cycles of attaching and separating, the force generally fades, and the connection strength diminishes in parallel with an increase of rotational play. Particularly, the significant forces for assembling new building blocks render them less suited for smaller children.

20 Another criterion is the capability and ease of 3-dimensional construction in connection with only a few types of building blocks. Most of the known building block systems provide a quite significant number of specially shaped
25 building blocks in order to deal with different situations.

Hence, it is one object of the present invention to propose a toy building block, which may be attached to another block with only reduced force, yet provides good interconnection
30 strength, particularly in view of rotational play.

It is a further object to provide means for fastening these building blocks to another.

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The first mentioned object is attained by the toy building block defined in claim 1. The further claims define preferred embodiments thereof, fastening means, which resolve the 2nd object, and a tool for operating the fastening means.

Accordingly, the building block according to the invention is provided on its surface with at least one stud. The stud of generally cylindrical shape has a cross-section which resembles a tooth wheel, with the teeth and grooves between the teeth being rounded. Preferably, the cross-section consists of a sequence of circle sections, or more generally curved sections, consecutively arranged with alternating convex-concave characteristics. Preferably, the grooves are made of arcs of larger diameter, i.e. smaller curvature than the teeth.

Complementary to the studs, in the bottom surface of the toy building blocks, recesses are provided with at least one vertically extending land. If a stud is inserted in a recess, the lands slide in the grooves of the studs. This movement requires a relatively small force. In contrast, due to the peculiar cross-section, there is about no sensible play with respect to rotation, even after a number of assembly / disassembly cycles.

The invention will be explained in detail by means of a preferred embodiment with reference to the figure:

Fig. 1 Front view of an arrangement made of the toy building blocks according to the invention with an integrated panel, with partial sectional view;

Fig. 2 Top view on the arrangement of Fig. 1;

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Fig. 3 Side view of a 3-stud building block, with partial cut;

Fig. 4 Top view on a 2-stud building block;

Fig. 5 Top view of a 2 x 2-stud building block;

Fig. 6a Elevational view with partial section of a screw;

Fig. 6b Top view of the screw of Fig. 6a;

Fig. 7a Elevational view of a screwdriver;

Fig. 7b Top view of the screwdriver of Fig. 7a.

The toy building block 1 is provided with studs 3 on its upper surface 4 and one or more recesses 6 in its lower surface 7 (Fig. 3). The studs 3 are of a toothwheel-like cross-section, with the teeth 9 and the interstices or grooves 10 inbetween showing a rounded shape. Particularly, they constitute a circular arrangement essentially of circle sections, with alternating curvature direction. In the example, the absolute value of the curvature of the tooth crests 12 is significantly higher than the curvature of the grooves 10. The cross-section of the studs is of 8-fold symmetry, i.e. the teeth are arranged according to a regular octagone.

Due to this rotational symmetry, the studs 3 and consequently the building blocks 1 can be attached to another block 1 in fixed rotational orientation in steps of 45°, namely linearly, transversely (90°) and by angles of 45°. Thereby, a manifold of three-dimensional arrangements can be created.

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Complementarily, the recesses 6 in the bottom of the building blocks 1 are provided with vertically extending lands 14. The cross-section of the lands 14 is chosen the way that they easily slide in the grooves 10 of a stud 3 inserted in the recess, yet provides a snug rotational fixation.

In the example, there is one recess provided per stud and each recess is provided with four lands 14.

10

For a safe interconnection, a variant of the building block (cf. Figs. 1, 3) is provided with a hole 17 provided with a first thread 19 in each stud 3. In the hole 17, a screw 21 can be inserted. The screw 21 has a second thread 23 in its thicker middle part, a third thread 25 at its end and a fourth thread 27 inwardly in its head 29. The third thread 25 is matched with the fourth thread 27 so that a screw 31 in an upper building block 33 can be screwed into the head 29 of the screw 35 in the building block 37 beneath (Fig. 1).

20

With the screws removed, the building blocks prepared for screws can be used together with the first type of building blocks not provided with holes 17. As well, building blocks of the first type may be stacked on building blocks of the 2nd type, regardless whether screws are present or not. For a transition from a 1st building block to a 2nd type building block, the latter may e.g. be provided with screws where the end bearing the 3rd thread is omitted.

30

The head 29 of the screw 21 is of cylindrical shape and provided with a central circular recess 39. The side wall of the recess 39 is again shaped toothwheel-like, yet this time, the teeth 40 inwardly directed are not rounded, though the grooves 41 outwardly directed are (Fig. 6b). Hence, a

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complementary shaped screwdriver tool 43 can be used to operate the screws 21 by inserting it in the head recess 39. The screwdriver 43 is simply a bar provided with the cross-section showing the required, complementary shape 44.

5 On one hand, this tool is simple in use, hence suited to children of low age, and the uneven surface guarantees a good grip. Furthermore, the screwdriver will not roll away due to its uneven surface, and when inserted in a screw head, it stands in the head by itself.

10

Reverting to the building blocks 1, the lateral outer faces are provided with slots 46, in which panels 47 can be inserted (cf. Fig. 1). Thereby, arrangements with the building blocks can be combined with panels showing

15 ornaments 48, colours, representations of cartoon figures, additional functional elements (wheels, instruments for generating sounds or tones) and the like.

The slots 46 are arranged in parallel to the central axis of
20 the studs 3 so that the panels 47 constitute a regular extension of the building blocks 1. In the example, the slots 46 are arranged in 90° position, yet additional slots may be provided, e.g. in 45° position.

25 Generally, the building blocks 1 may provide one (Fig. 1; 49) or more studs 3, equivalent to constructional units. E.g. Fig. 4 shows a constructional block 50 with 2 studs or 2 constructional units, Figs. 1, 2 and 3 one 51 with 3 construction units in linear arrangement, and Fig. 5
30 one 52 with 4 construction units in a quadratic arrangement. As it is shown as well, the corners of the constructional blocks may be edged, however slightly rounded for safety reasons (cf. Fig. 5, edges 54), or the ends of the building block may be shaped like a cylinder (cf. Fig. 1, shape of
35 single-stud block 49, and Figs. 2 and 3, end sections of 2-

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stud and 3-stud blocks 50 and 51).

Another advantageous aspect of the illustrated building blocks consists in that they are based on a cubic unity,
5 i.e. a volume unit with cell height 60, cell width 62 and cell length 64 all being identical. Thereby, building 3-dimensional constructions is simplified, and the number of required types of building blocks is reduced to a few only.

10 As variants thereof, building blocks may be considered, where one or the other of the dimensions (length, width and/or height) are an integer multiple or fraction of the basic unit.

15 The building blocks are manufactured by blow molding. As the so obtained building blocks are hollow, they are light and even float. By this production manner, e.g. building blocks based on 60 mm length unit can be manufactured, which are tough and are suited for little children due to their size,
20 yet are light. In view of the blowing, it is an advantage that sharp edges can be totally eliminated from the shape of the building blocks.

Still to mention, as an example, that it is possible to use
25 the blown building blocks as a package, for fluid materials like beverages or liquid soap, and instead of being thrown away, it later serves as a toy.

The building blocks may also be manufactured by another
30 process, e.g. injection molding. However, blowing permits more freedom in shaping the surface in comparison with injection molding.

In practice, another advantageous property has been
35 observed: the building blocks manufactured by blowing slide

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- very easily into another, yet the faces of the studs show an adhesion effect to the zones of contact within the recesses of the construction stacked upon. This effect improves the final construction in view of stability and rigidity without
- 5 impairing ease of disassembly. From an esthetical point of view, it is observed that the shape of the studs reminds of flowers which gives an attractive impression, especially for smaller children, and serves as an ornamental element.
- 10 As well, the screws may be manufactured by any suited process. For instance, they may be blow-molded. The thereby obtained screws are hollow and light-weight. Another nearby manufacturing process is injection molding.
- 15 From the description of the preferred execution example, the one skilled in the art may easily derive variants without leaving the scope of the invention which is defined by the claims.
- 20 Some variants one may think of are:
- The building blocks may bear any other number of studs and / or recesses, e.g. 6, 8, in various arrangements.
 - 25 - The symmetry of the studs may be varied, e.g. an 12fold symmetry corresponding to rotational steps of 30° may be chosen. Even symmetries of an odd order may be considered, though they render an even simple construction rather difficult, if not impossible to realize for children.
 - 30 - The basic units may be varied in a wide range. Also, one or the other of the units may differ from the other basic units, e.g. the height unit may be one half of the width and length unit.
- 35

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- The building blocks may consist of a large variety of materials, which can be used in the chosen manufacturing process, preferably blowing. Preferred are, of course, light materials like polymers, possibly reinforced by fibrous materials, even of organic or biologic origin.
- The basic shape may vary, e.g. to comply with a prior use as a bottle, or a container.
- 10 - The bottom recesses are shaped otherwise, e.g. with three sidewalls each bearing a land, or at least one bearing a land for rotational fixation more sidewalls may be present providing a polygonal cross-section.
- 15 - The top surface may be inclined with respect to the bottom plane for building angled stacks.
- As fastening means, bayonet connectors are used.

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Claims

1. Toy building block (1), capable to being stacked, with
at least one stud (3) on the top surface (4) and at least
5 one recess (6) in the bottom surface (7), wherein the studs
(3) are insertable in the recesses (6), characterized in
that the cross-section of the studs (3) is
toothwheel-like, the studs (3) showing a circumferentially
arranged, substantially equally spaced sequence of teeth
10 with rounded crests (12) and interspersed grooves (10)
rounded as well,
in that the sidewall of the recesses (6) is provided
with at least one essentially vertically extending land
shaped complementary to the grooves (10), and
15 in that the recesses (6) are shaped the way that a stud
(3) inserted in the recess is guided by at least three zones
of contact, at least one of which being a land (6)
engageable in a groove (10).
- 20 2. Toy building block (1) according to claim 1,
characterized in that at least three lands (14), preferably
four, six or eight lands, and most preferred four lands, are
present in the recess (6).
- 25 3. Toy building block (1) according to one of claims 1 or
2, characterized in that the lands (14) constitute the
majority and preferably all contact zones for guiding a stud
(3) when inserted.
- 30 4. Toy building block (1) according to one of claims 1 to
3, characterized in that the studs (3) show a rotational
symmetry of at least 4.
5. Toy building block (1) according to one of claims 1 to
35 4, characterized in that the rotational symmetry of the

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studs is 6, 8 or 12, preferably 8.

6. Toy building block (1) according to one of claims 1 to 5, characterized in that it consists of essentially cubic constructional units, each construction unit being provided with one stud (3) and one recess (6).

7. Toy building block (1, 33, 37) according to one of claims 1 to 6, characterized in that centrally in at least one stud (3) or one recess (6), a pass-through hole (17) is provided with a first thread (19), the hole (17) extending from top to bottom of the building block (1), so that a screw (21) may be screwed through the construction block (1).

8. Toy building block (1, 33, 37) according to claim 7, characterized in that the holes (17) are provided with an enlargement within the studs (3) for being capable of receiving the head of a screw (21).

9. Toy building block (1, 33, 37) according to one of claims 1 to 8, characterized in that it is manufactured by blowing, preferably by blowing of a material comprising polymeric mass as an essential constituent, in order to obtain a hollow, light-weight product.

10. Toy building block (1, 33, 37) according to one of claims 1 to 9, characterized in that it is provided with slots (46), preferably vertically extending slots, for holding edges of construction devices like panels (47).

11. Screw (21, 31, 35) for a toy construction block (1, 33, 37) according to one of claims 7 to 10, characterized in that it is provided with a head (29), a 2nd thread (23) matched with a first thread (19), on the middle

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part of its body, a third thread (25) on its body terminal section, the third thread having a smaller diameter than the 2nd thread, and a fourth inner thread (27) in the head (29) of the screw, the fourth thread (27) being matched with the 3rd thread so that the screw may be screwed in the head of another one.

12. Screw (21, 31, 35) for a toy construction block (1, 33, 35) according to one of claims 7 to 10 or screw according to claim 11, characterized in at least a second thread (23) on its body is matched to the first thread (19) for being screwed into the hole (17) of a toy building block, and in that the head (29) of the screw is provided with a recess (39), the recess having a cross-section composed of regularly arranged, inwardly directed crests (40) separated by circle-likely shaped grooves (41), so that a complementarily shaped end of a tool (43) may be inserted and rotationally fixed in the head (29).
13. Screw (21, 31, 35) according to claim 12, characterized in that the cross-section of the recess (39) in its head (29) has at least four, preferably 6 to 12 crests (40).

14. Screwdriver tool (43) for a screw (21, 31, 35) according to one of claims 12 to 13, characterized in that it is essentially a rod with its cross-section being essentially complementarily shaped to the recess (39) in the screw (21, 31, 35).

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Abstract

A toy building block (1) for stacking is provided on top (4) with one or more studs (3) and in the bottom (7) with
5 recesses (6). The studs (4) show a toothwheel-like cross-section with rounded teeth crests (12) and rounded grooves (10) between the teeth (12) as well. The recesses (6) are provided each with a number of vertically extending lands (14) matching in shape the grooves (10). The studs easily
10 slide in and out of the recesses (6), yet a rotational arretation of low play is obtained. Preferably, the building blocks are produced by a blowing process and may be provided with screws (21) for a safe interconnection. External slots (46) may allow the combination with panels (47) bearing
15 images, additional functional elements etc.

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20 (Fig. 2)

FIG. 1

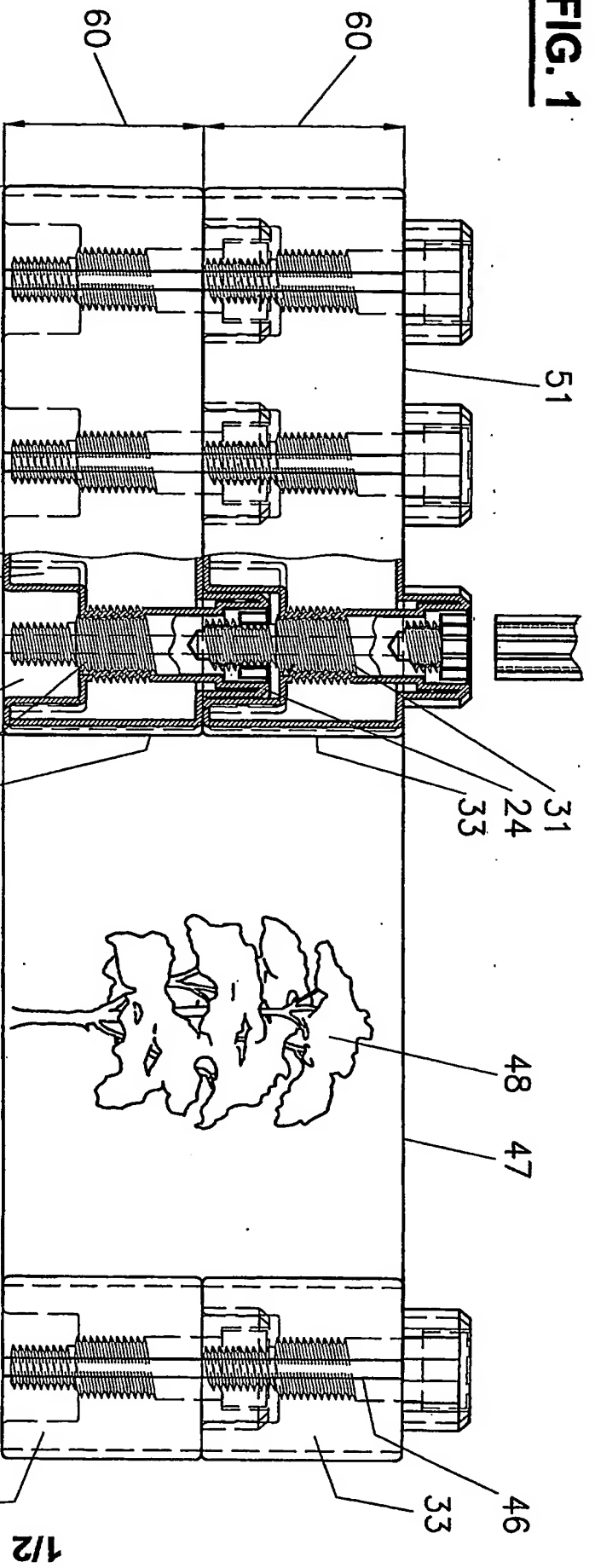


FIG. 2

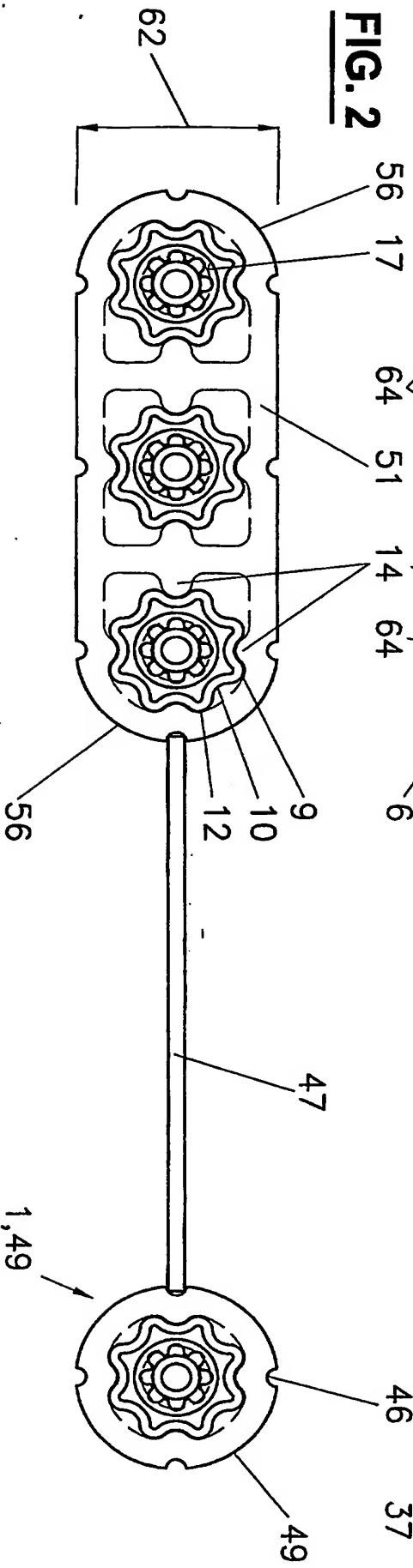


FIG. 3

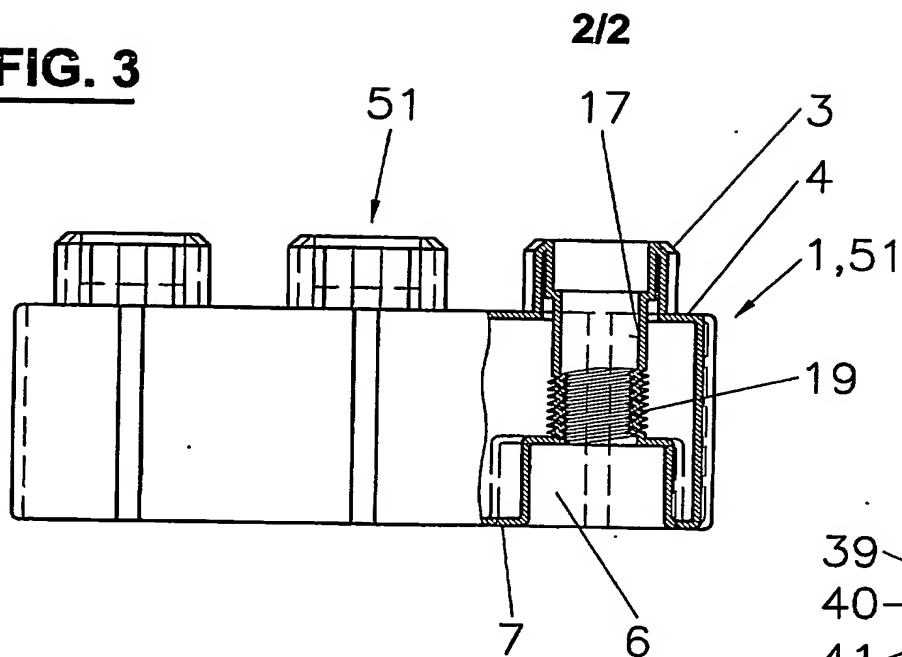


FIG. 6a

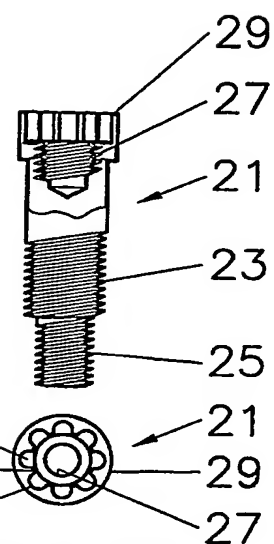


FIG. 6b

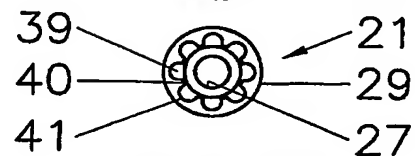


FIG. 4

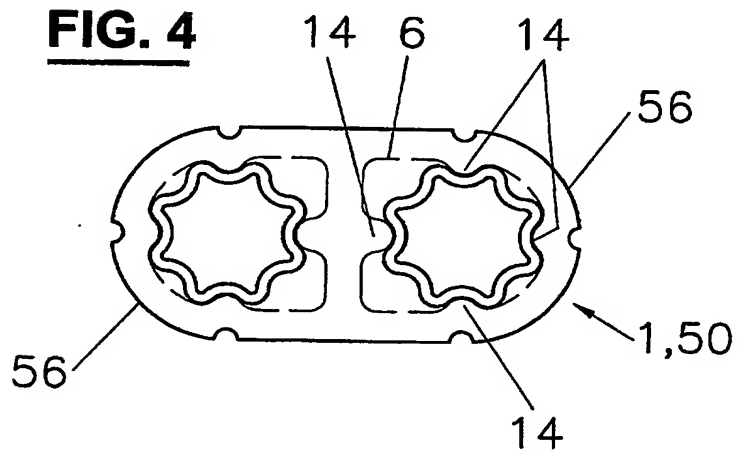


FIG. 7a

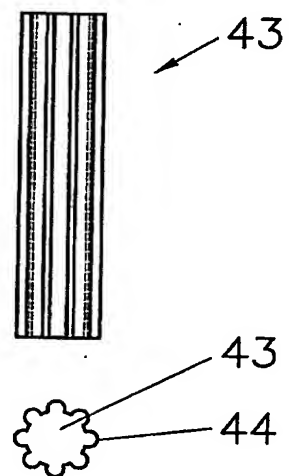
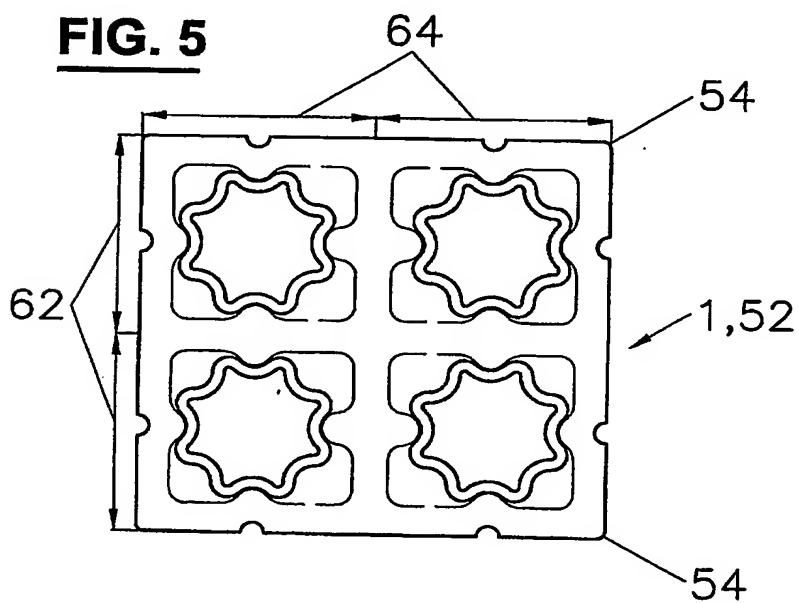


FIG. 7b



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